



Social Justice & Math

A social justice activity can be successfully used from year to year without a lot of time-intensive reworking.

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Assigning activities based on current or past events allows students to explore mathematics in a social context. While doing mathematics in this way, students rarely ask, “When am I ever going to use this?” Using social justice events in the mathematics classroom is a way for teachers to provide contextual problems that will reach all students and promote equity. As defined by NCTM, equity “demands that reasonable and appropri-



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ate accommodations be made as needed to promote access and attainment for all students” (NCTM 2000, p. 12).

WHY AN ACTIVITY ON SOCIAL JUSTICE?

I define *social justice* as justice that is attainable in all facets of society. This definition reminds readers and students that social justice should not be limited to race, ethnicity, culture,

social class, health concerns, or environmental or gender issues.

How do social justice themes allow teachers to reach all students? First, these issues should relate to student interests. When students are given an opportunity to explore issues that are relevant to them, they are more likely to be motivated to complete assignments. Second, these assignments give teachers a way to reach students who are not

fond of mathematics. Using socially themed activities promotes positive experiences with mathematics. Third, students observe the power of mathematics, understand why it is important, and are empowered to view the world through mathematics (Freire 2002).

Research supports using social themes in the mathematics classroom (Banks 1991; Frankenstein 1990; Gutstein 2003, 2006; Johnson

2005; Presmeg 1998, 2000; Moses and Cobb 2001a, 2001b; Tate 1995). Teachers who used such activities were able to reach students successfully who did not always feel a connection with the curriculum (Johnson 2005). Learning mathematics in an environment in which social issues are explored empowers students “to read the world” and see it in a socio-political context; in the process, it will transform their view of mathematics (Gutstein 2003, p. 44).

TEACHERS’ DILEMMAS

After interactions with K–grade 12 teachers at various conferences, many teachers who use these relevant social activities expressed a concern about teaching the same activity year to year. Presenting an activity involving a current social event initiated by students, a best-case scenario, requires a tremendous amount of time for an activity used only once. How would today’s prospective teachers react to exploring a social justice activity based on an event that is almost nineteen years old?

SETTING THE STAGE

Although various social justice themed activities were used in the course taught to prospective teachers, one activity in particular was examined. The South Central activity, used by many middle school teachers (Gutstein 2006), was selected for two reasons:

1. This event took place about twenty years ago; and
2. It contains rich mathematics, such as ratios, estimation, the idea of radius and density, area and circumference of a circle, and problem solving.

In my conversations with prospective teachers, some vaguely recalled hearing about the Rodney King verdict at

some point and others were unfamiliar with the case.

INTRODUCING THE ACTIVITY

Thirty-two prospective teachers in an Informal Geometry course designed for nonmathematics majors took part in this activity. I began by giving them a news article to read based on the Rodney King police brutality case and the 1991 Los Angeles riots. A thirty-minute brainstorming session then ensued. Approximately 94 percent of the prospective teachers were African American, and 3 percent were each Caucasian and Latino. These questions guided the session after they read this article (<http://www.crimsonbird.com/history/rodneyking.htm>):

1. What are your thoughts, ideas, and reflections about the article?
2. What are some examples of social issues? What is social justice?
3. What are some inequities that impact African Americans and Latinos?
4. Can mathematics help explain the events in question 3?

On day 1, I allowed the prospective teachers to speak freely. Next, I redirected the classroom discourse to this question: “What are some examples of social justice?” As the students explained, I recorded the information on the board. Once all had contributed, I then asked, “Which of the following is/are correct?”

Then I asked, “What are some inequities that impact African Americans and Latinos?” Once again, I recorded the list of inequities on the board so that students could keep track of all ideas as others were generated throughout the discussion (see **fig. 1**). The purpose was to identify, before the activity began, what the students deemed important about inequities that impact some populations.

Fig. 1 Students generated this list of inequities that impact African Americans and Latinos, which was supplied by the prospective teachers on day 1 of the lesson.

No power
No positive environment
Lack of school resources
Age and sex discrimination
Law enforcement
Credit profiling
Home and school environment
Technology illiteracy
Racial profiling
Separate but equal
Lack of black history
Youth lack of motivation
Role models
Media
Discrimination in the workplace

WORKING THROUGH THE ACTIVITY

The South Central activity explored problem solving in a real-world context and content typically found in a traditional Euclidean geometry course (Gutstein 2006). Students worked in seven groups of four to five students each. At the conclusion of day 1, I distributed the first question (see **fig. 2**) to each group. I also provided almanacs and road atlases from various states for all groups to use, if desired.

Question 1 asked students to identify a community and determine the population of that community (the communities selected by each group were spread throughout the United States). The objective for this task was for the students to establish reasonable ratios of movie theaters, community centers, and liquor stores to the number of people in their selected community while using mathematics to support their claim. Most of the groups proposed that communities populated with African Americans and Latinos would have a greater ratio of liquor stores than both community

centers and movie theaters. The class discussed why the liquor store ratio would be greater in these areas.

On day 2 of the activity, I distributed the second question, which asked each group to select an average city in the United States and then define an “average” city. Then the group established a reasonable number of movie theaters, community centers, and liquor stores. Finally, they concluded with reasons for their estimation using mathematics. Since all groups selected different cities, solutions for question 2 varied from group to group. Once again, the students used various resources such as almanacs, road atlases, and the Internet to support their estimates.

The groups’ estimations sparked a discussion as to why certain cities would have higher or lower numbers of community centers, movie theaters, and liquor stores. Some of the students commented that an average city with a college or university would have more liquor stores, whereas a city with more suburbs would have more community centers and movie theaters (see **table 1**).

On day 3, I distributed question 3 along with maps from www.yahoo.com of South Central Los Angeles.

Fig. 2 The questions posed as part of the South Central activity provided a social context for applying mathematical concepts.

1. Three businesses found in U.S. communities are movie theaters, community centers, and liquor stores. What seems to be a reasonable ratio of each of these businesses to population? In other words, how many people would you expect to find in an area as compared with a movie theater, community center, or liquor store? On what number are you basing your estimate?
 2. Think about an average city in the United States. What does “average” mean to you? Think about a U.S. city that is relatively crowded but has mainly homes and some apartment buildings. What do you think would be a reasonable number of community centers, movie theaters, and liquor stores? On what number are you basing your estimate?
 3. The Rodney King verdict occurred in 1992. When the verdict was announced and South Central Los Angeles rioted, National Public Radio (NPR) reported on the actual number of movie theaters, community centers, and liquor stores in a “three-mile radius” in South Central. What would you estimate the number of each to be in South Central Los Angeles?
 4. (a) As reported on NPR, 0 movie theaters, 0 community centers, but 640 liquor stores were in the three-mile radius area. What would you say is the density of liquor stores in the area?
(b) If the liquor stores are randomly distributed throughout the three-mile radius area, about how far does anyone need to walk from their house to go to a liquor store?
- Every student is to complete these questions on his or her own:
5. (a) Why are these data important?
(b) What mathematics did you use and learn in this activity?
(c) How was the mathematics important for you to understand the social and political issues?
(d) If this were your neighborhood, would you do anything about this situation? Why, or why not? If so, what would you do?

Table 1 The prospective teachers predicted the number of movie theaters, community centers, and liquor stores in an average city (question 2) and in a three-mile radius in South Central Los Angeles (question 3).

Groups	Question 2 (Assigned Neighborhood)			Question 3 (South Central L.A.)		
	Movie Theaters	Community Centers	Liquor Stores	Movie Theaters	Community Centers	Liquor Stores
1	1	1	2	2	12	252
2	6	6	25	4	16	144
3	8	24	19	48	12	35
4	7	18	36	2	10	70
5	30	20	45	15	25	35
6	2	2	7	8	10	35
7	2	5	15	2	2	2

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This task asked students to *estimate* the number of movie theaters, community centers, and liquor stores in a three-mile radius in South Central Los Angeles. Although the groups were not expected to identify a reason for their estimations, they were encouraged to use mathematics. The next part of the question asked students to *determine* the number of community centers, movie theaters, and liquor stores in a three-mile radius in South Central Los Angeles.

After the groups counted the number of liquor stores per block, they were able to project the number of movie theaters and community centers. Then I wrote the following statistics on the board:

- Community centers: 0
- Movie theaters: 0
- Liquor stores: 640

The students were outraged by these numbers.

On the last day of the activity (day 4), each group was given question 4. This question required students to determine the density of liquor stores in the three-mile radius in South Central Los Angeles. In other words, students were to calculate how many liquor stores per person and per city block. All groups were able to calculate the desired ratios within the three-mile radius.

Finally, I distributed question 5 to each group. Each member of the seven groups was required to answer all four parts of the question. At the end of the South Central Los Angeles activity, the students gathered to discuss their responses and conclude the activity.

USING THE SAME LESSON FROM YEAR-TO-YEAR

From this investigation, the prospective teachers were able to explore a social event that took place almost

twenty years ago. Since some of the prospective teachers were unfamiliar with the social event in the activity, we watched an eight-minute Internet video about the Rodney King police brutality case and the Los Angeles riots. Since many of the prospective teachers were unfamiliar with this case, middle grades teachers may find themselves trying to help make the connections for their students. Even though the prospective teachers were not initially familiar with the Rodney King event, after viewing the video all were able to make their own connections based on experience or knowing someone who experienced some form of police brutality.

When using the same social justice activity from year to year, some questions might need to be modified. The South Central Activity was not modified for the prospective teachers in this investigation. Students may wish to explore the number of community centers, movie theaters, and liquor stores in a three-mile radius in their neighborhood or a three-mile radius from their school.

BENEFITS FOR INSTRUCTION

Teachers in search of activities to energize the curriculum can bring a fresh perspective while using social justice themed activities. This invigorating of the curriculum could also

influence middle grades students who are typically distant from the curriculum to consider the importance of mathematics or to pursue advanced mathematics at the secondary level. Most important, using the same activity from year to year can benefit all students; however, this topic does not need to be limited to social justice events that explore culture, race, or ethnicity. Social issues such as environmental concerns or economic issues can be studied. Some benefits for using the same activity from year to year are that it allows students to—

- investigate past social events using mathematics;
- make connections to past events; and
- explore the importance of citizenship in their communities.

CLOSING THOUGHTS

Students are usually required to complete real-world problems that they cannot relate to or drill-and-practice exercises. Social justice themed activities help students appreciate the connection of mathematics to their lives.

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